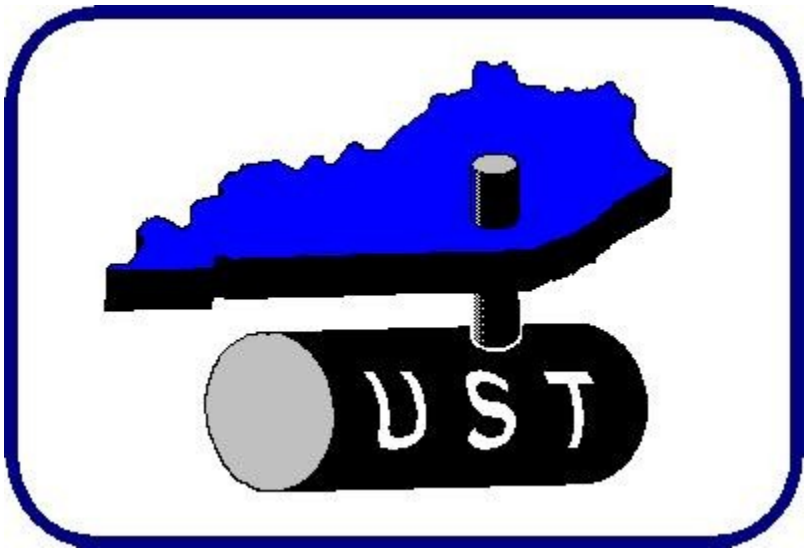
CLASSIFICATION OUTLINE



ENERGY AND ENVIRONMENT CABINET
DIVISION OF WASTE MANAGEMENT
UNDERGROUND STORAGE TANK BRANCH
200 FAIR OAKS LANE, 2ND FLOOR
FRANKFORT, KENTUCKY 40601
502-564-5981

AUGUST 2006

CLASSIFICATION OUTLINE

This document shall be used, in accordance with Kentucky Administrative Regulation 401 KAR 42:080, to categorize UST facilities containing petroleum, that submitted a Notice of Intent to Permanently Close Underground Storage Tanks Form or reported a UST system release after the effective date of this administrative regulation, into one of four (4) classes based upon their potential impact to human health, safety, and the environment. UST facilities shall be classified by assessing site-specific conditions as documented by a Professional Engineer (P.E.) registered with the Kentucky Board of Licensure for Professional Engineers and Land Surveyors, or a Professional Geologist (P.G.) registered with the Kentucky Board of Registration for Professional Geologists, in order to establish the allowable residual levels of petroleum.

A Classification Guide DEP8056/01/06 shall be completed for UST facilities containing petroleum at the time of permanent closure or when directed by the cabinet in order to appropriately classify the site. Knowledge of site history and other site-specific information, and further research on the part of the owner or operator, may be necessary to complete the Classification Guide. The Classification Guide shall be completed, signed, and submitted with the Closure Assessment Report Form DEP8055/08/06 (see the Closure Outline (August 2006) incorporated by reference in 401 KAR 42:070), Site Check Report (see the Site Check Outline (August 2006) incorporated by reference in 401 KAR 42:060), or when specified by the cabinet.

Site classification shall be amended, if warranted, due to changes in site conditions, additional information, or if a release from the UST system is documented to have no potential impact on previously identified environmentally sensitive features, domestic-use wells, springs, or cisterns. An amended Classification Guide shall be submitted by the owner or operator when requested by the cabinet.

If an affected off-site property owner consents, the allowable residual soil levels in Class III or Class IV applicable on-site may be utilized in addressing contamination within the property boundaries of that consenting property owner. Such consent shall be submitted to the cabinet on the Affected Property Owner Consent Form DEP8057/01/06 which is incorporated by reference in 401 KAR 42:080 and shall be accompanied by a site map identifying the location and address of the affected property in relation to the site.

Sample collection and management shall be performed in accordance with 401 KAR 42:060, Section 10.0 of the Site Investigation Outline. The cabinet may evaluate instrument/method detection limits, the method's quantitation limits, relative standard deviation and sample matrices in the assessment and validation of laboratory results. The cabinet may consider the variability in analytical results within the laboratory methods specified in USEPA SW-846.

UST facilities with multiple UST systems may classify each individually only if the UST systems are separated by 100 meters (328 feet) or more.

For definition of terms used within this outline, refer to 401 KAR 42:005.

Closure of underground storage tank systems under this classification system shall not constitute designation as a residual landfill.

If you have any questions, contact the Underground Storage Tank Branch at 502-564-5981.

CLASS I

1.0 Criteria for Closure Under Class I

All of the following criteria shall be established and verified by a registered professional engineer or registered professional geologist in order for a site to close under Class I:

1.1 Three (3) UST systems or fewer are present at the site. UST facilities that have had more than three (3) regulated UST systems at a site since December 22, 1988, shall not be allowed closure under Class I;

1.2 The combined total capacity of all UST systems, present at a site since December 22, 1988, is less than 6,000 gallons;

1.3 The UST systems were taken out of service and empty prior to December 22, 1988. UST systems that have been filled with water or other inert materials shall not contain amounts of free product in excess of 2.5 centimeters (one inch), or 0.3 percent by weight of the total capacity of the UST system in order to close under Class I;

1.4 Closure of the UST system is to be performed by removal. UST facilities performing closure in place shall not be allowed closure under Class I;

1.5 No domestic-use wells, springs, cisterns, or well head protection areas are located within a 100-meter (328 feet) radius from the excavation zone;

1.6 No environmentally sensitive features are located within a 100-meter (328 feet) radius from the excavation zone, or are sufficiently determined to be hydrogeologically upgradient from the excavation zone;

1.7 No clear evidence of a UST system release is observed within the excavation zone or excavated materials (fumes, odors, free product etc.);

1.8 Once all backfill material has been removed to the original limits of the excavation zone and/or piping trench, excavation activities shall cease in order to observe the excavation. See Section 2.0 below regarding water within the excavation; and

1.9 No surficial evidence of a subsurface UST system release (seeps, springs, etc.) is observed outside of the excavation within a 150-meter (492 feet) radius from the excavation zone.

2.0 Water in the Excavation

Inspect any water encountered within the excavation zone for evidence of a UST system release (e.g., free product on water surface). If any potential evidence of a UST system release is observed, a determination shall be made as to whether the water encountered meets the definition of groundwater as defined in 401 KAR 42:005. No action shall be required for groundwater within the excavation zone, which exhibits no observable evidence of a UST system release.

2.1 Water, determined to be groundwater, indicating evidence of a UST system release shall be sampled and analyzed according to the protocol established in the Closure Outline (August 2006).

If analysis indicates that the levels in this groundwater are above those specified in Groundwater Table I, the site shall not be allowed closure under Class I and shall close under either Class III or Class IV.

If analysis indicates that the levels in this groundwater are below those specified in Groundwater Table I, the site may continue closure under Class I.

2.2 Water encountered within the excavation zone which does not meet the definition of groundwater, but exhibits potential evidence of a UST system release, must be recovered and disposed of properly.

3.0 Excavated Backfill Material

3.1 Sampling Requirements

Excavated backfill material which exhibits any potential evidence of a UST system release (e.g., unidentified staining or odors), shall be sampled and analyzed, according to the protocol established in the Closure Outline (August 2006), to the levels specified in Soil Table 3.

If analysis indicates levels above those specified in Soil Table 3, the site shall not be allowed closure under Class I.

If analysis indicates levels below those specified in Soil Table 3, the site may continue closure under Class I.

3.2 Disposal Requirements

If no clear evidence of a UST system release is observed, the material may:

- be used as backfill for the excavation zone; or
- be disposed of at a permitted landfill or landfarm;

If excavated backfill material with unidentified potential evidence of a UST system release is sampled, analyzed, and meets the levels specified in Soil Table 3, the material may be used for an unrestricted off-site purpose.

For facilities seeking reimbursement for eligible disposal costs per 401 KAR 42:330, all excavated backfill material shall be sampled and analyzed in accordance with the Closure Outline (August 2006).

4.0 Closure

Once it has been established that the criteria and requirements of Sections 1, 2, and 3 have been satisfied, no further assessment of the excavation zone shall be necessary.

5.0 Documentation Requirements

5.1 All data and supporting information shall be collected and submitted to the cabinet demonstrating that the requirements and criteria in Sections 1, 2 and 3 have been met.

5.2 Color photographs or color photocopies of the excavation zone shall be submitted to the cabinet.

5.3 A completed and signed Classification Guide shall be submitted to the cabinet.

5.4 Refer to the Closure Outline (August 2006) for additional closure documentation requirements.

CLASS II

1.0 Criteria for Closure Under Class II

All of the following criteria shall be established and verified by a registered professional engineer or registered professional geologist in order to close a site under Class II:

1.1 Closure of the UST system is to be performed by removal. UST facilities performing closure in place shall not be allowed closure under Class II;

1.2 External UST system release detection devices (as specified in 40 CFR 280.43 (e) and (f)), interstitial monitoring, or secondary barriers have been in operation for the operational life of the UST system. This includes vapor monitoring, groundwater monitoring, interstitial monitoring or secondary barriers;

1.3 No leaks or UST system releases have been detected over the operational life of the UST system; and

1.4 No evidence of a UST system release is observed in the excavation zone (fumes, odors, holes in tanks or piping, free product, etc.) after backfill material has been removed. When native soils are encountered, excavation activities shall cease in order to observe the excavation zone.

2.0 Water in the Excavation

Inspect any water encountered within the excavation zone for evidence of a UST system release (e.g., free product on water surface). If any potential evidence of a UST system release is observed, a determination shall be made as to whether the water encountered meets the definition of groundwater as defined in 401 KAR 42:005. No action shall be required for groundwater within the excavation zone, which exhibits no observable evidence of a UST system release.

2.1 Water, determined to be groundwater, indicating evidence of a UST system release shall be sampled and analyzed according to the protocol established in the Closure Outline (August 2006).

If analysis indicates that the levels in this groundwater are above those specified in Groundwater Table I, the site shall not be allowed closure under Class II and shall close under either Class III or Class IV.

If analysis indicates that the levels in this groundwater are below those specified in Groundwater Table I, the site may continue closure under Class II.

2.2 Water encountered within the excavation zone which does not meet the definition of groundwater, but exhibits potential evidence of a UST system release, must be recovered and disposed of properly.

3.0 Excavated Backfill Material

3.1 Sampling Requirements

If the above criteria for closure under Class II have been met, sampling of the removed backfill material is not required unless the owner or operator is seeking reimbursement (see Section 3.3 below).

3.2 Disposal Requirements

If any evidence of a UST system release (fumes, odors, staining etc.) is present within the removed backfill material, the material shall be disposed of at a permitted landfill or landfarm.

Any removed backfill material to be used for an unrestricted off-site purpose, shall be sampled and analyzed, according to the protocol established in the Closure Outline (August 2006), to meet the levels specified in Soil Table 3.

If no clear evidence of a UST system release is observed, the material may:

- be used as backfill for the excavation zone; or
- be disposed of at a permitted landfill or landfarm;

If excavated backfill material with unidentified potential evidence of a UST system release is sampled, analyzed, and meets the levels specified in Soil Table 3, the material may be used for an unrestricted off-site purpose.

3.3 Reimbursement for Disposal

For facilities seeking reimbursement for eligible disposal costs per 401 KAR 42:330, all excavated backfill material shall be sampled and analyzed in accordance with the Closure Outline (August 2006).

4.0 Closure

Once it has been established that the criteria and requirements of Sections 1 and 2 have been satisfied, no further assessment of the excavation zone shall be necessary.

5.0 Documentation Requirements

5.1 All data and supporting information that demonstrate that the requirements and criteria in Sections 1 and 2 have been met shall be collected and submitted to the cabinet.

5.2 Color photographs or color photocopies of the excavation zone shall be submitted to the cabinet.

5.3 A completed and signed Classification Guide shall be submitted to the cabinet.

5.4 Refer to the Closure Outline (August 2006) for additional closure documentation requirements.

CLASS III

1.0 Criteria for Closure Under Class III

All of the following criteria shall be established and verified by a registered professional engineer or registered professional geologist in order for a site to close under Class III:

1.1 No domestic use wells, springs, cisterns, or well head protection areas are located within a 100-meter (328 feet) radius from the excavation zone.

1.2 No environmentally sensitive features are located within a 50-meter (164 feet) radius from the excavation zone, or are sufficiently documented to be hydrogeologically upgradient from the excavation zone.

1.3 No surficial evidence of a subsurface UST system release (seeps, springs etc.) is observed outside of the excavation, or fumes detected inside buildings, within a 150-meter (492 feet) radius from the excavation zone.

2.0 General Requirements for UST Facilities Closing Under Class III

2.1 Refer to the Closure Outline (August 2006) incorporated by reference in 401 KAR 42:070 for the required actions, if free product is encountered within the excavation zone.

2.2 For UST facilities undergoing permanent closure activities, soils within the excavation zone, piping trenches, excavated material, or closed-in-place soil borings shall be sampled and analyzed according to the protocol specified in the Closure Outline (August 2006) incorporated by reference in 401 KAR 42:070.

2.3 For UST facilities undergoing a site check, soils shall be sampled and analyzed according to the protocol specified in the Site Check Outline (August 2006) incorporated by reference in 401 KAR 42:060.

2.4 If petroleum constituents in soil exceed those specified in the applicable Class III Soil Table, a site investigation shall be performed according to the Site Investigation Outline (August 2006) incorporated by reference in 401 KAR 42:060 as directed by the cabinet.

2.5 Assess sanitary sewer lines, storm sewer lines, and telephone man-vaults within a 50-meter (164 feet) radius from the excavation zone for levels exceeding ten percent (10%) of the Lower Explosive Limit (LEL). If LEL levels exceed ten percent (10%), initial abatement measures as prescribed by the UST System Release Response and Initial Abatement Requirements Outline (August 2006) shall be followed.

3.0 Groundwater

3.1 Any groundwater encountered during the closure process shall be sampled and analyzed according to the protocol specified in the Closure Outline (August 2006).

3.2 Any groundwater encountered during a site check shall be sampled and analyzed according to the protocol specified in the Site Check Outline (August 2006).

3.3 Section 4.3 of the Closure Outline (August 2006) shall be followed if assessment of groundwater, in the hydrogeologically downgradient area most likely to be affected by a UST system release, is necessary.

3.4 If levels of petroleum constituents in groundwater exceed allowable levels, a site investigation shall be performed in accordance with the Site Investigation Outline (August 2006) as directed by the cabinet.

4.0 Establishing Soil Cleanup Standards

Two tables, Class III Soil Table 1 and Class III Soil Table 2, specify the allowable residual petroleum constituent levels in soil for closure under Class III. A site-specific determination, based on the subsequent criteria in Class III, Sections 5.0 and 7.0 shall be made to establish the appropriate Class III Soil Table to be used.

UST facilities required to use Soil Table 1 shall perform the one-meter assessment required in Section 4.2 of the Closure Outline (August 2006) incorporated by reference in 401 KAR 42:070 in order to determine the presence of groundwater. The following determinations shall be made based on the presence or absence of groundwater:

- If groundwater is not encountered in the one-meter assessment the allowable level for total lead in soil shall be 400 PPM (mg/kg).

- If groundwater is encountered in the one-meter assessment a site-specific ambient background assessment shall be completed. Ambient background shall be established in accordance with the Kentucky Guidance for Ambient Background Assessment (January 8, 2004) document. The allowable level for total lead in soil shall be the established ambient background or 50 PPM (mg/kg) whichever is greater.

CLASS III SOIL TABLE 1

5.0 Class III Soil Table 1 Criteria

Class III Soil Table 1 shall be used if any of the following are present:

5.1 The site is located in a carbonate bedrock setting, as determined through a geologic quadrangle map analysis, (see Section 5.1 on page 14-15 for a detailed description of this geologic setting);

5.2 Domestic use wells, springs, cisterns, or well head protection areas are located within a 100- to 300-meter (328 feet to 984 feet) radius from the excavation zone;

5.3 Environmentally sensitive features are located within a 50- to 150-meter (164 feet to 492 feet) radius from the excavation zone and are hydrogeologically downgradient from the excavation zone;

5.4 Groundwater is encountered in the excavation zone or piping trench excavation, or borings as required for closure in place and active systems;

5.5 Groundwater is not encountered within the excavation zone or piping trench excavation, or borings as required for closure in place and active systems, and documentation has not been submitted to demonstrate that groundwater is at a depth of more than 30 feet from the surface; and

5.6 Water supply lines, sanitary sewer lines, storm sewer lines, or telephone man-vaults are located within a 50-meter (164 feet) radius from the excavation zone.

6.0 Allowable Levels Beyond the Point of Compliance

6.1 Any residual soil levels in excess of those specified in Class III Soil Table 1, which extend outside of the Point of Compliance, shall be remediated to achieve the specified Class IV Soil Matrix Table levels as determined by the following procedures:

- determine the appropriate Class IV Soil Matrix Table, soil type, and depth to groundwater according to the protocol established within Class IV; and
- using the 0- to 100-meter distance parameter within the Class IV Soil Matrix Table, apply the site-specific soil type and depth to groundwater measurements to

determine the allowable levels of petroleum constituents in soil. NOTE: In no situation shall soil levels exceeding those specified in Class III Soil Table 1 be allowed outside of the Point of Compliance except as specified in Section 6.2 below.

Class III Soil Table 1 levels may, however, be applied to soil within the Point of Compliance in this situation.

6.2 If an affected off-site property owner consents, the allowable residual soil levels in Class III applicable on-site may be utilized in addressing contamination within the property boundaries of that consenting property owner. Such consent shall be submitted to the cabinet on the Affected Property Owner Consent Form DEP8057/01/06 which is incorporated by reference in 401 KAR 42:080 and shall be accompanied by a site map identifying the location and address of the affected property in relation to the site.

CLASS III SOIL TABLE 2

7.0 Class III Soil Table 2 Criteria

Class III Soil Table 2 may be used if all of the following are established:

7.1 Domestic use wells, springs, cisterns, or well head protection areas are located beyond a 300-meter (984 feet) radius from the excavation zone;

7.2 Environmentally sensitive features are located beyond a 150-meter (492 feet) radius from the excavation zone, or are sufficiently determined to be hydrogeologically upgradient from the excavation zone;

7.3 Site-specific information is submitted to demonstrate that groundwater is at a depth of more than 30 feet from the surface; and

7.4 Soil samples collected at the nearest hydrogeologically downgradient Point of Compliance indicate levels below those specified in Class III Soil Table 1. (See Section 8.0 below)

8.0 Point of Compliance Assessment Requirement When Class III Soil Table 2 Is Used

All UST facilities requesting closure under Class III Soil Table 2 shall assess the hydrogeologically downgradient Point of Compliance. Three (3) soil borings shall be conducted to a depth of 15 feet from the surface or to the soil/bedrock interface if encountered less than 15 feet from the surface. Soil exhibiting the highest field instrumentation reading from each boring shall be collected in accordance with state sampling protocol and analyzed individually to the standards specified in Class III Soil Table 1. (See Section 9.2 below.)

9.0 Allowable Levels Beyond the Point of Compliance

9.1 Any residual soil levels in excess of those specified in Class III Soil Table 1 at or extending outside of the Point of Compliance (see section 8.0 above) shall be remediated to achieve the specified Class IV Matrix Table levels as determined by the following procedures:

- determine the appropriate Class IV Soil Matrix Table, soil type, and depth to groundwater according to the protocol established within Class IV; and
- using the 0- to 100-meter distance parameter within the Class IV Soil Matrix Table, apply the site-specific soil type and depth to groundwater measurements to determine the allowable levels of petroleum constituents in soil. NOTE: In no

situation shall soil levels exceeding those specified in Class III Soil Table 1 be allowed outside of the Point of Compliance except as specified in Section 9.2 below.

Class III Soil Table 1 levels shall be applied to soil within the Point of Compliance in this situation.

9.2 If an affected off-site property owner consents, the allowable residual soil levels in Class III applicable on-site may be utilized in addressing contamination within the property boundaries of that consenting property owner. Such consent shall be submitted to the cabinet on the Affected Property Owner Consent Form DEP8057/01/06 which is incorporated by reference in 401 KAR 42:080 and shall be accompanied by a site map identifying the location and address of the affected property in relation to the site.

10.0 Excavated Material (Table 1 or Table 2)

10.1 Sampling Requirements

All excavated material shall be sampled and analyzed in accordance with the Closure Outline (August 2006).

10.2 Disposal Requirements

The following options are available for the disposal of excavated material:

- Excavated material may be used as backfill for the excavation zone if analysis indicates levels below those specified in the applicable table (Class III Tables 1 or 2). If this option is chosen, a layer of clean material shall be placed above the backfilled excavated material to a minimum depth of two (2) meters (6.5 feet) from the ground surface.
- Excavated material may be disposed of at a permitted landfill or landfarm.
- If the excavated material is to be used for any un-restricted off-site purpose, it shall be sampled and analyzed to the levels specified in Soil Table 3. Each soil sample shall be analyzed for BTEX, PAH, and Total Lead. If analysis indicates levels above those specified in Soil Table 3, the material shall be disposed of properly.

11.0 Documentation Requirements (Table 1 and Table 2)

11.1 All data and supporting information shall be collected and submitted to the cabinet.

11.2 A completed and signed Classification Guide shall be submitted to the cabinet.

11.3 Refer to the Closure Outline (August 2006) for additional closure documentation requirements.

11.4 A completed and signed Affected Property Owner Consent Form DEP8057/01/06 shall be submitted, if applicable.

12.0 Other Considerations

- For additional information regarding standards for lead, refer to the U. S. EPA Region 9 Preliminary Remediation Goals, and the Region 9 PRG's Table User's Guide/Technical Background Document (October 2002).
- Refer to the U. S. EPA Guidance Manual for the IEUBK Model for Lead in Children, EPA PB93-963510 OSWER #9285.7-15-1 (February 1994).
- Refer to the U. S. EPA User's Guide for the Integrated Exposure Uptake Biokenetic Model for Lead in Children (IEUBK), EPA 540-K-01-005 OSWER #9285.7-42 (May 2002).

CLASS III SOIL TABLE 1

BTEX	
BENZENE	2 PPM
TOLUENE	18 PPM
ETHYLBENZENE	30 PPM
XYLENE (TOTAL)	50 PPM
PAH	
Ch	15 PPM
B(a)A	0.15 PPM
cPAH	0.3 PPM
nPAH	10 PPM
NAP	5.0 PPM
Total Lead	
Refer to Class III Section 4.0	

CLASS III SOIL TABLE 2

BTEX	
BENZENE	10 PPM
TOLUENE	90 PPM
ETHYLBENZENE	150 PPM
XYLENE (TOTAL)	250 PPM
PAH	
Ch	15 PPM
B(a)A	0.15 PPM
cPAH	0.3 PPM
nPAH	100 PPM
NAP	50 PPM
Total Lead	
400 PPM	

BTEX:	Benzene, Toluene, Ethylbenzene, and Xylene (total)
PAH:	Polynuclear Aromatic Hydrocarbons
Ch:	Allowable level individually for Chrysene
B(a)A:	Allowable level individually for Benzo(a)anthracene
cPAH:	Allowable level individually for Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, and Ideno(1,2,3-cd)pyrene
nPAH:	Allowable level individually for Acenaphthene, Acenaphthylene, Anthracene, Benzo(ghi)perylene, Fluoranthene, Fluorene, Phenanthrene, and Pyrene.
NAP:	Allowable Level Individually for Naphthalene
PPM:	mg/kg - parts per million

Completion of the Classification Guide will determine the allowable levels in groundwater, if applicable.

NOTE: The UST Branch may consider the variability in analytical results within the laboratory methods specified in USEPA SW-846.

CLASS IV

1.0 Procedural Requirements

The following procedures shall be required to establish the allowable levels of petroleum constituents in soil for closure, and shall be documented by a registered professional engineer or registered professional geologist. This class includes all UST facilities that do not meet the requirements of Classes I, II or III.

1.1 Refer to the Closure Outline (August 2006) incorporated by reference in 401 KAR 42:070 for the required actions, if free product is encountered within the excavation zone.

1.2 Soil type shall be determined according to grain size. The soil samples to be analyzed for grain size shall be collected from the bottom of the excavation zone, with three (3) samples collected along the longest straight line that can be drawn diagonally across the excavation zone; taking one sample at each end and one in the middle of the line. (UST facilities performing closure in place shall collect samples from the bottom of three (3) of the borings required.) Each of these samples shall be classified individually according to ASTM Designation: D 422-63 (Re-approved 1990) Standard Test Method For Particle-Size Analysis of Soils. The soil type shall be defined by the 50 percent value (D50) as plotted on a grain size distribution curve (a semi-logarithmic plot) with weight percent finer plotted on the arithmetic scale and the grain sizes plotted on the semi-logarithmic scale. If two or more of the three soils analyzed fall into one soil type, that soil type shall apply to the site. If the soil types are all different, the “sand” soil type shall apply to the site.

If collection of soil samples is not possible from the bottom of the excavation due to bedrock, three (3) samples shall be collected from the walls of the excavation zone as close to the bottom of the excavation zone as possible for grain size analysis using the above methodology. In situations where the excavation zone is made up entirely of bedrock and soil sample collection is not possible from either the bottom or the walls of the excavation zone, the “sand” soil type shall apply to the site.

1.3 Determine the depth of any groundwater encountered during the closure process.

1.4 Determine the distance to the nearest hydrogeologically downgradient Point of Compliance from the excavation zone.

1.5 Determine the distance to any hydrogeologically downgradient environmentally sensitive features within a 300-meter (984 feet) radius from the excavation zone.

1.6 Determine the distance to any domestic use wells, springs, cisterns, or well head protection areas within a 300-meter (984 feet) radius from the excavation zone.

1.7 Investigate and document any evidence of fumes or petroleum odors in adjacent buildings within a 150-meter (492 feet) radius from the excavation zone.

2.0 General Requirements For UST Facilities Closing Under Class IV

2.1 Refer to the Closure Outline (August 2006) incorporated by reference in 401 KAR 42:070 for the required actions, if free product is encountered within the excavation zone.

2.2 For UST facilities undergoing permanent closure activities, soils within the excavation zone, piping trenches, excavated material, or closed-in-place soil borings shall be sampled and analyzed according to the protocol specified in the Closure Outline (August 2006) incorporated by reference in 401 KAR 42:070.

2.3 For UST facilities undergoing a site check, soils shall be sampled and analyzed according to the protocol specified in the Site Check Outline (August 2006) incorporated by reference in 401 KAR 42:060.

2.4 If petroleum constituents in soil exceed those specified in the applicable Class IV Soil Matrix Table, a site investigation shall be performed according to the Site Investigation Outline (August 2006) incorporated by reference in 401 KAR 42:060 as directed by the cabinet.

2.5 Assess sanitary sewer lines, storm sewer lines, and telephone man-vaults within a 50-meter (164 feet) radius from the excavation zone for levels exceeding ten percent (10%) of the Lower Explosive Limit (LEL). If LEL levels exceed ten percent (10%), initial abatement measures as prescribed by the UST System Release Response and Initial Abatement Requirements Outline (August 2006) shall be followed.

3.0 Groundwater

3.1 Any groundwater encountered during the closure process shall be sampled and analyzed according to the protocol specified in the Closure Outline (August 2006).

3.2 Any groundwater encountered during a site check shall be sampled and analyzed according to the protocol specified in the Site Check Outline (August 2006).

3.3 Section 4.3 of the Closure Outline (August 2006) shall be followed if assessment of groundwater, in the hydrogeologically downgradient area most likely to be affected by a UST system release, is necessary.

3.4 If levels of petroleum constituents in groundwater exceed the allowable levels, a site investigation shall be performed in accordance with the Site Investigation Outline (August 2006) as directed by the cabinet.

4.0 Selection of a Matrix Table

Each site in Class IV shall be placed into one of three Class IV Soil Matrix Tables, which indicate the allowable soil levels for closure, based upon the geologic setting in which the site is located. The geologic setting of the site shall be determined by locating the site on a 7.5-Minute USGS Geological Quadrangle Map. A description of the geology is in the legend where a geologic column for the quadrangle and a detailed description of the formations is presented.

NOTE: Any site with plastic PVC water supply lines within a 50-meter (164 feet) radius from the excavation zone, or with storm sewer lines, sanitary sewer lines, or telephone manvaults within a 50-meter (164 feet) radius from the excavation zone which, when measured within the conduit, indicate levels exceeding ten percent (10%) of the Lower Explosive limit (LEL), shall be placed into Class IV Soil Matrix Table I.

5.0 Geologic Formations Included in Each Matrix Table

5.1 Class IV Soil Matrix Table I

Carbonate Bedrock Settings: These areas are underlain by carbonate rocks including limestone, dolostone, interbedded limestone and shale, or interbedded dolostone and shale. Carbonate rocks will be shown on the 7.5-Minute USGS Geologic Quadrangle Map as geologic formations composed of limestone or dolomite.

5.2 Class IV Soil Matrix Table II

Alluvium: These areas are underlain by deposits of Quaternary Alluvium found predominantly in the valleys along major streams (third order or greater). This setting

includes sediments of lacustrine deposition or sediments derived from other glacial deposits.

Fractured Shales: These areas are underlain by thick sections of fractured shale and include the Devonian and Lower Mississippian shales as well as other areas of the state where shale is the predominant bedrock material.

Fractured Sandstone and Shale (Eastern Coal Field): These areas are underlain by alternating units of sandstone, siltstone, shale, limestone, coal, and clay. These deposits are mapped on the Geologic Quadrangle maps as predominantly Pennsylvanian in age and occur in the Eastern Coal Field Physiographic Region of the state.

5.3 Class IV Soil Matrix Table III

Gulf Coastal Plain Sediments: These areas are underlain by sediments of Cretaceous and Tertiary Age and are commonly overlain by Pleistocene loess. This geologic setting is found mainly in the Jackson Purchase Physiographic Region of Western Kentucky. Note: Quaternary Alluvial deposits located within the Jackson Purchase Physiographic region are not considered Gulf Coastal Plain Sediments and shall be referred to Class IV Soil Matrix Table II.

Fractured Sandstone and Shale (Western Coal Field): These areas are underlain by alternating units of sandstone, siltstone, shale, limestone, coal, and clay. These deposits are mapped on the Geologic Quadrangle maps as predominantly Pennsylvanian in age and occur in the Western Coal Field Physiographic Region of the state.

6.0 Criteria To Determine Appropriate Soil Levels Within Each Class IV Soil Matrix Table

Once the site has been placed into the appropriate Class IV Soil Matrix Table, the applicable soil levels shall be based on all of the following criteria:

- depth to groundwater;
- distance to the nearest hydrogeologically downgradient Point of Compliance from the excavation zone;
- distance to domestic use wells, springs, cisterns, or well head protection areas if less than the distance to the nearest hydrogeologically downgradient property line;
- distance to hydrogeologically downgradient environmentally sensitive features if less than the distance to the nearest hydrogeologically downgradient property line; and
- soil type present at the site (sand, silt, or clay).

NOTE: Environmentally sensitive features within 300-meters (984 feet) shall not dictate the allowable levels in this class if sufficient documentation is submitted to indicate that the feature is hydrogeologically upgradient from the excavation zone.

The one-meter assessment required in Section 4.2 of the Closure Outline (August 2006) incorporated by reference in 401 KAR 42:070 shall be performed in order to determine the presence of groundwater. The following determinations shall be made based on the presence or absence of groundwater:

- If groundwater is not encountered in the one-meter assessment the allowable level for total lead in soil shall be 400 PPM (mg/kg).

- If groundwater is encountered in the one-meter assessment a site-specific ambient background assessment shall be completed. Ambient background shall be established in accordance with the Kentucky Guidance for Ambient Background Assessment (January 8, 2004) document. The allowable level for total lead in soil shall be the established ambient background or 50 PPM (mg/kg) whichever is greater.

7.0 Determining Depth To Groundwater

7.1 Depth to groundwater shall be determined by one of the following:

- assessment of existing monitoring devices;
- performance of a site-specific investigation (e.g. drilling to groundwater, etc.) to determine depth to groundwater; or
- a visual examination of the excavation zone and piping trench -- if existing monitoring devices are not present at the site for an actual determination to be made as to depth to groundwater, or to avoid a site-specific investigation, e.g., drilling until groundwater is encountered, etc. If groundwater is encountered within the excavation zone, piping trench, or borings as required for closure in place and active systems, the 4.5-meter depth to groundwater levels shall be used within the appropriate Class IV Soil Matrix Table. If groundwater is not present within the excavation zone, piping trench, or borings as required for closure in place and active systems, the actual depth of the excavation zone shall be noted, and the depth listed in the appropriate Class IV Soil Matrix Table which is equal to or immediately greater than the actual depth of the excavation zone shall be used for initial classification.

7.2 If an actual determination of depth to groundwater, below the bottom of the excavation, is made which falls between the depths listed within the Class IV Soil Matrix Tables, the upper depth listed shall be used to determine allowable levels. For example, if the depth to groundwater is established at 12 meters through a site-specific determination, the 10.5-meter depth to groundwater levels shall be used as opposed to the 13.5-meter depth to groundwater levels.

8.0 Allowable Levels Beyond the Point of Compliance

8.1 Any residual soil levels in excess of those specified in Class III Soil Table 1, which extend outside of the Point of Compliance, shall be remediated to achieve the specified Class IV Soil Matrix Table levels as determined by the following procedures:

- determine the appropriate Class IV Soil Matrix Table, soil type, and depth to groundwater according to the protocol established within Class IV;
- using the 0- to 100-meter distance parameter within the Class IV Soil Matrix Table, apply the site-specific soil type and depth to groundwater measurements to determine the allowable levels of petroleum constituents in soil. NOTE: In no situation shall soil levels exceeding those specified in Class III Soil Table 1 be allowed outside of the Point of Compliance except as specified in Section 8.2 below.

Original Class IV Soil Matrix Table levels may, however, be applied to soil within the Point of Compliance in this situation.

8.2 If an affected off-site property owner consents, the allowable residual soil levels in Class IV applicable on-site may be utilized in addressing contamination within the property boundaries of that consenting property owner. Such consent shall be submitted to the cabinet on the Affected Property Owner Consent Form DEP8057/01/06 which is incorporated by reference in 401 KAR 42:080 and shall be accompanied by a site map identifying the location and address of the affected property in relation to the site.

9.0 Excavated Material

9.1 Sampling Requirements

All excavated material shall be sampled and analyzed in accordance with the Closure Outline (August 2006).

9.2 Disposal Requirements

The following options are available for the disposal of excavated material:

- Excavated material may be used as backfill for the excavation zone if analysis indicates levels below those specified in the applicable Class IV Soil Matrix Table. If this option is chosen, a layer of clean material shall be placed above the backfilled excavated material to a minimum depth of two (2) meters (6.5 feet) from the ground surface;
- Excavated material may be disposed of at a permitted landfill or landfarm; or
- If the excavated material is to be used for any un-restricted off-site purpose, it shall be sampled and analyzed to the levels specified in Soil Table 3. Each soil sample shall be analyzed for BTEX, PAH, and Total Lead. If analysis indicates levels above those specified in Soil Table 3, the material shall be disposed of properly.

10.0 Documentation Requirements

10.1 All data and supporting information shall be collected and submitted to the cabinet.

10.2 A completed and signed Classification Guide shall be submitted to the cabinet.

10.3 Refer to the Closure Outline (August 2006) for additional closure documentation requirements.

10.4 A completed and signed Affected Property Owner Consent Form DEP 8057/01/06 shall be submitted, if applicable.

11.0 Other Considerations

- For additional information regarding standards for lead, refer to the U. S. EPA Region 9 Preliminary Remediation Goals, and the Region 9 PRG's Table User's Guide/Technical Background Document (October 2002).
- Refer to the U. S. EPA Guidance Manual for the IEUBK Model for Lead in Children, EPA PB93-963510 OSWER #9285.7-15-1 (February 1994).
- Refer to the U. S. EPA User's Guide for the Integrated Exposure Uptake Biokenetic Model for Lead in Children (IEUBK), EPA 540-K-01-005 OSWER #9285.7-42 (May 2002).

CLASS IV SOIL MATRIX TABLE I - (A)

(Gasoline, Kerosene, Jet Fuel)

SOIL TYPE	DEPTH TO GROUNDWATER (METERS)	DISTANCE TO HYDROGEOLOGICALLY DOWNGRADIENT POINT OF COMPLIANCE, DOMESTIC USE WELL, SPRING, CISTERN, OR WELL HEAD PROTECTION AREA, OR ENVIRONMENTALLY SENSITIVE FEATURE		
		0 - 100 METERS	100 - 300 METERS	> 300 METERS
		B/T/E/X (PPM)	**B/T/E/X (PPM)**	**B/T/E/X (PPM)**
SAND	4.5	0.1/35/30/210	0.1/100/120/500	1.0/180/300/500
	5.5	0.5/110/100/500	0.4/180/300/500	4.0/180/300/500
	7.5	0.8/180/160/500	0.8/180/300/500	7.0/180/300/500
	10.5	1.0/180/230/500	1.0/180/300/500	10/180/300/500
		0 - 100 METERS	100 - 300 METERS	> 300 METERS
		B/T/E/X (PPM)	**B/T/E/X (PPM)**	**B/T/E/X (PPM)**
SILT	4.5	0.1/35/30/230	0.1/100/120/500	1.0/180/300/500
	5.5	0.4/80/80/500	0.4/180/290/500	4.0/180/300/500
	7.5	0.6/180/140/500	0.6/180/300/500	6.0/180/300/500
	10.5	1.0/180/240/500	1.0/180/300/500	12/180/300/500
		0 - 100 METERS	100 - 300 METERS	> 300 METERS
		B/T/E/X (PPM)	**B/T/E/X (PPM)**	**B/T/E/X (PPM)**
CLAY	4.5	0.1/35/30/240	0.1/100/120/500	1.0/180/300/500
	5.5	0.3/80/60/470	0.3/180/220/500	3.0/180/300/500
	7.5	0.5/150/100/500	0.5/180/300/500	5.0/180/300/500
	10.5	2.0/180/300/500	2.0/180/300/500	16/180/300/500

B/T/E/X: Benzene/Toluene/Ethylbenzene/Xylene (total)
PPM: mg/kg - parts per million

Completion of the Classification Guide will determine the allowable levels in groundwater, if applicable.

NOTE: The UST Branch may consider the variability in analytical results within the laboratory methods specified in USEPA SW-846.

CLASS IV SOIL MATRIX TABLE I - (B)
(Diesel, Waste Oil, New Oil)

SOIL TYPE	DEPTH TO GROUNDWATER (METERS)	DISTANCE TO HYDROGEOLOGICALLY DOWNGRADIENT POINT OF COMPLIANCE, DOMESTIC USE WELL, SPRING, CISTERN, OR WELL HEAD PROTECTION AREA, OR ENVIRONMENTALLY SENSITIVE FEATURE		
		0 - 100 METERS	100 - 300 METERS	> 300 METERS
		Ch/B(a)A/cPAH/nPAH/NAP (PPM) LEAD (PPM)	**Ch/B(a)A/cPAH/nPAH/NAP (PPM) LEAD (PPM)**	**Ch/B(a)A/cPAH/nPAH/NAP (PPM) LEAD (PPM)**
SAND	4.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	5.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	7.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	10.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
		0 - 100 METERS	100 - 300 METERS	> 300 METERS
		Ch/B(a)A/cPAH/nPAH/NAP (PPM) LEAD (PPM)	**Ch/B(a)A/cPAH/nPAH/NAP (PPM) LEAD (PPM)**	**Ch/B(a)A/cPAH/nPAH/NAP (PPM) LEAD (PPM)**
SILT	4.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	5.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	7.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	10.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
		0 - 100 METERS	100 - 300 METERS	> 300 METERS
		Ch/B(a)A/cPAH/nPAH/NAP (PPM) LEAD (PPM)	**Ch/B(a)A/cPAH/nPAH/NAP (PPM) LEAD (PPM)**	**Ch/B(a)A/cPAH/nPAH/NAP (PPM) LEAD (PPM)**
CLAY	4.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	5.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	7.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	10.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0

PAH: Polynuclear Aromatic Hydrocarbons
Ch: Allowable level individually for Chrysene
B(a)A: Allowable level individually for Benzo(a)anthracene
cPAH: Allowable level individually for Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, and Ideno(1,2,3- cd)pyrene
nPAH: Allowable Level Individually for Acenaphthene, Acenaphthylene, Anthracene, Benzo(ghi)perylene, Fluoranthene, Fluorene, Phenanthrene, and Pyrene.
NAP: Allowable Level Individually for Naphthalene
PPM: mg/kg - parts per million

Completion of the Classification Guide will determine the allowable levels in groundwater, if applicable.

NOTE: The UST Branch may consider the variability in analytical results within the laboratory methods specified in USEPA SW-846.

CLASS IV SOIL MATRIX TABLE II - (A)
(Gasoline, Kerosene, Jet Fuel)

SOIL TYPE	DEPTH TO GROUNDWATER (METERS)	DISTANCE TO HYDROGEOLOGICALLY DOWNGRADIENT POINT OF COMPLIANCE, DOMESTIC USE WELL, SPRING, CISTERN, OR WELL HEAD PROTECTION AREA, OR ENVIRONMENTALLY SENSITIVE FEATURE		
		0 - 100 METERS	100 - 300 METERS	> 300 METERS
		B/T/E/X (PPM)	**B/T/E/X (PPM)**	**B/T/E/X (PPM)**
SAND	4.5	0.01/0.5/0.4/3.0	0.07/45/100/330	20/180/300/500
	5.5	0.01/2.0/2.0/18	0.3/180/300/500	20/180/300/500
	7.5	0.02/7.0/4.0/40	0.9/180/300/500	20/180/300/500
	10.5	0.05/20/10/90	2.0/180/300/500	20/180/300/500
	13.5	0.1/40/20/190	4.0/180/300/500	20/180/300/500
	16.5	0.2/70/40/320	7.0/180/300/500	20/180/300/500
	23.5	1.0/180/210/500	20/180/300/500	20/180/300/500
		0 - 100 METERS	100 - 300 METERS	> 300 METERS
		B/T/E/X (PPM)	**B/T/E/X (PPM)**	**B/T/E/X (PPM)**
SILT	4.5	0.01/0.5/0.4/3.0	0.07/45/100/330	20/180/300/500
	5.5	0.03/2.0/4.0/40	1.0/180/300/500	20/180/300/500
	7.5	0.2/40/30/330	10/180/300/500	20/180/300/500
	10.5	0.8/180/180/500	20/180/300/500	20/180/300/500
	13.5	6.0/180/300/500	20/180/300/500	20/180/300/500
	16.5	20/180/300/500	20/180/300/500	20/180/300/500
	23.5	20/180/300/500	20/180/300/500	20/180/300/500
		0 - 100 METERS	100 - 300 METERS	> 300 METERS
		B/T/E/X (PPM)	**B/T/E/X (PPM)**	**B/T/E/X (PPM)**
CLAY	4.5	0.01/0.5/0.4/3.0	0.07/45/100/330	20/180/300/500
	5.5	0.1/50/40/250	7.0/180/300/500	20/180/300/500
	7.5	19/180/300/500	20/180/300/500	20/180/300/500
	10.5	20/180/300/500	20/180/300/500	20/180/300/500
	13.5	20/180/300/500	20/180/300/500	20/180/300/500
	16.5	20/180/300/500	20/180/300/500	20/180/300/500
	23.5	20/180/300/500	20/180/300/500	20/180/300/500

B/T/E/X: Benzene/Toluene/Ethylbenzene/Xylene (total)
PPM: mg/kg - parts per million

Completion of the Classification Guide will determine the allowable levels in groundwater, if applicable.

NOTE: The UST Branch may consider the variability in analytical results within the laboratory methods specified in USEPA SW-846.

CLASS IV SOIL MATRIX TABLE II - (B)
(Diesel, Waste Oil, New Oil)

SOIL TYPE	DEPTH TO GROUNDWATER (METERS)	DISTANCE TO HYDROGEOLOGICALLY DOWNGRADIENT POINT OF COMPLIANCE, DOMESTIC USE WELL, SPRING, CISTERN, OR WELL HEAD PROTECTION AREA, OR ENVIRONMENTALLY SENSITIVE FEATURE		
		0 - 100 METERS	100 - 300 METERS	> 300 METERS
		Ch/B(a)A/cPAH/nPAH/NAP (PPM) LEAD (PPM)	**Ch/B(a)A/cPAH/nPAH/NAP (PPM) LEAD (PPM)**	**Ch/B(a)A/cPAH/nPAH/NAP (PPM) LEAD (PPM)**
SAND	4.5	15/0.15/0.3/3.0/1.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	5.5	15/0.15/0.3/9.0/2.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	7.5	15/0.15/0.3/10/4.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	10.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	13.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	16.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	23.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
		0 - 100 METERS	100 - 300 METERS	> 300 METERS
		Ch/B(a)A/cPAH/nPAH/NAP (PPM) LEAD (PPM)	**Ch/B(a)A/cPAH/nPAH/NAP (PPM) LEAD (PPM)**	**Ch/B(a)A/cPAH/nPAH/NAP (PPM) LEAD (PPM)**
SILT	4.5	15/0.15/0.3/3.0/1.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	5.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	7.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	10.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	13.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	16.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	23.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
		0 - 100 METERS	100 - 300 METERS	>300 METERS
		Ch/B(a)A/cPAH/nPAH/NAP (PPM) LEAD (PPM)	**Ch/B(a)A/cPAH/nPAH/NAP (PPM) LEAD (PPM)**	**Ch/B(a)A/cPAH/nPAH/NAP (PPM) LEAD (PPM)**
CLAY	4.5	15/0.15/0.3/3.0/1.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	5.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	7.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	10.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	13.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	16.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	23.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0

PAH: Polynuclear Aromatic Hydrocarbons
Ch: Allowable level individually for Chrysene
B(a)A: Allowable level individually for Benzo(a)anthracene
cPAH: Allowable level individually for Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, and Ideno(1,2,3-cd)pyrene
nPAH: Allowable Level Individually for Acenaphthene, Acenaphthylene, Anthracene, Benzo(ghi)perylene, Fluoranthene, Fluorene, Phenanthrene, and Pyrene.
NAP: Allowable Level Individually for Naphthalene
PPM mg/kg - parts per million

Completion of the Classification Guide will determine the allowable levels in groundwater, if applicable.
NOTE: The UST Branch may consider the variability in analytical results within the laboratory methods specified in USEPA SW-846.

CLASS IV SOIL MATRIX TABLE III - (A)

(Gasoline, Kerosene, Jet Fuel)

SOIL TYPE	DEPTH TO GROUNDWATER (METERS)	DISTANCE TO HYDROGEOLOGICALLY DOWNGRADIENT POINT OF COMPLIANCE, DOMESTIC USE WELL, SPRING, CISTERN, OR WELL HEAD PROTECTION AREA, OR ENVIRONMENTALLY SENSITIVE FEATURE		
		0 - 100 METERS	100 - 300 METERS	> 300 METERS
		B/T/E/X (PPM)	**B/T/E/X (PPM)**	**B/T/E/X (PPM)**
SAND	4.5	0.01/0.5/0.4/3.0	0.01/4.0/5.0/30	0.1/60/150/430
	5.5	0.01/2.0/1.0/13	0.04/16/18/110	0.3/180/300/500
	7.5	0.01/4.0/2.0/20	0.08/30/30/170	0.6/180/300/500
	10.5	0.02/6.0/3.0/30	0.1/50/40/250	0.9/180/300/500
	13.5	0.02/8.0/4.0/40	0.1/70/50/310	1.0/180/300/500
	16.5	0.03/9.0/5.0/50	0.2/80/60/390	1.0/180/300/500
	23.5	0.05/15/8.0/80	0.3/120/100/500	2.0/180/300/500
		0 - 100 METERS	100 - 300 METERS	> 300 METERS
		B/T/E/X (PPM)	**B/T/E/X (PPM)**	**B/T/E/X (PPM)**
SILT	4.5	0.01/0.5/0.4/3.0	0.01/4.0/5.0/30	0.1/60/150/430
	5.5	0.01/1.0/1.0/10	0.04/10/13/90	0.3/130/300/500
	7.5	0.01/3.0/2.0/20	0.06/25/20/170	0.5/180/300/500
	10.5	0.02/5.0/3.0/30	0.1/45/40/260	1.0/180/300/500
	13.5	0.03/8.0/5.0/45	0.2/70/60/390	1.0/180/300/500
	16.5	0.04/12/9.0/70	0.2/100/100/500	2.0/180/300/500
	23.5	0.09/30/18/150	0.6/180/220/500	4.0/180/300/500
		0 - 100 METERS	100 - 300 METERS	> 300 METERS
		B/T/E/X (PPM)	**B/T/E/X (PPM)**	**B/T/E/X (PPM)**
CLAY	4.5	0.01/0.5/0.4/3.0	0.01/4.0/5.0/30	0.1/60/150/430
	5.5	0.01/0.7/0.8/7.0	0.03/6.0/10/60	0.3/80/280/500
	7.5	0.01/2.0/1.0/13	0.05/19/17/110	0.4/180/300/500
	10.5	0.03/7.0/7.0/40	0.2/60/80/370	1.0/180/300/500
	13.5	0.09/20/15/120	0.5/170/180/500	4.0/180/300/500
	16.5	0.4/50/35/290	2.0/180/300/500	18/180/300/500
	23.5	0.5/50/70/330	3.0/180/300/500	20/180/300/500

B/T/E/X: Benzene/Toluene/Ethylbenzene/Xylene (total)
PPM: mg/kg - parts per million

Completion of the Classification Guide will determine the allowable levels in groundwater, if applicable.

NOTE: The UST Branch may consider the variability in analytical results within the laboratory methods specified in USEPA SW-846.

CLASS IV SOIL MATRIX TABLE III - (B)

(Diesel, Waste Oil, New Oil)

SOIL TYPE	DEPTH TO GROUNDWATER (METERS)	DISTANCE TO HYDROGEOLOGICALLY DOWNGRADIENT POINT OF COMPLIANCE, DOMESTIC USE WELL, SPRING, CISTERN, OR WELL HEAD PROTECTION AREA, OR ENVIRONMENTALLY SENSITIVE FEATURE		
		0 - 100 METERS	100 - 300 METERS	> 300 METERS
		Ch/B(a)A/cPAH/nPAH/NAP (PPM) LEAD (PPM)	**Ch/B(a)A/cPAH/nPAH/NAP (PPM) LEAD (PPM)**	**Ch/B(a)A/cPAH/nPAH/NAP (PPM) LEAD (PPM)**
SAND	4.5	15/0.15/0.3/3.0/1.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	5.5	15/0.15/0.3/8.0/2.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	7.5	15/0.15/0.3/10/2.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	10.5	15/0.15/0.3/10/4.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	13.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	16.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	23.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
SILT		0 - 100 METERS	100 - 300 METERS	> 300 METERS
		Ch/B(a)A/cPAH/nPAH/NAP (PPM) LEAD (PPM)	**Ch/B(a)A/cPAH/nPAH/NAP (PPM) LEAD (PPM)**	**Ch/B(a)A/cPAH/nPAH/NAP (PPM) LEAD (PPM)**
	4.5	15/0.15/0.3/3.0/1.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	5.5	15/0.15/0.3/6.0/1.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	7.5	15/0.15/0.3/10/3.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	10.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/50/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	13.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/50/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	16.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/50/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	23.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/50/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
CLAY		0 - 100 METERS	100 - 300 METERS	> 300 METERS
		Ch/B(a)A/cPAH/nPAH/NAP (PPM) LEAD (PPM)	**Ch/B(a)A/cPAH/nPAH/NAP (PPM) LEAD (PPM)**	**Ch/B(a)A/cPAH/nPAH/NAP (PPM) LEAD (PPM)**
	4.5	15/0.15/0.3/3.0/1.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	5.5	15/0.15/0.3/8.0/2.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	7.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	10.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	13.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	16.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0
	23.5	15/0.15/0.3/10/5.0 See Section 6.0	15/0.15/0.3/20/10 See Section 6.0	15/0.15/0.3/100/50 See Section 6.0

PAH: Polynuclear Aromatic Hydrocarbons
Ch: Allowable level individually for Chrysene
B(a)A: Allowable level individually for Benzo(a)anthracene
cPAH: Allowable level individually for Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, and Ideno(1,2,3-cd)pyrene
nPAH: Allowable Level Individually for Acenaphthene, Acenaphthylene, Anthracene, Benzo(ghi)perylene, Fluoranthene, Fluorene, Phenanthrene, and Pyrene.
NAP: Allowable Level Individually for Naphthalene
PPM mg/kg - parts per million

Completion of the Classification Guide will determine the allowable levels in groundwater, if applicable.

NOTE: The UST Branch may consider the variability in analytical results within the laboratory methods specified in USEPA SW-846.

SOIL TABLE 3

ALLOWABLE SOIL LEVELS IN EXCAVATED MATERIALS TO BE USED FOR UN-RESTRICTED OFF-SITE PURPOSES*

BTEX
BENZENE 0.01 PPM TOLUENE 0.7 PPM ETHYLBENZENE 0.9 PPM XYLENE 5.0 PPM
PAH
Ch 15 PPM B(a)A 0.15 PPM cPAH 0.3 PPM nPAH 3.0 PPM NAP 1.0 PPM
Total Lead 50 PPM

BTEX:	Benzene, Toluene, Ethylbenzene, and Xylene (total)
PAH:	Polynuclear Aromatic Hydrocarbons
Ch:	Allowable level individually for Chrysene
B(a)A:	Allowable level individually for Benzo(a)anthracene
cPAH:	Allowable level individually for Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, and Ideno(1,2,3-cd)pyrene
nPAH:	Allowable Level Individually for Acenaphthene, Acenaphthylene, Anthracene, Benzo(ghi)perylene, Fluoranthene, Fluorene, Phenanthrene, and Pyrene.
NAP:	Allowable Level Individually for Naphthalene
PPM:	mg/kg - parts per million
*	Soil samples shall be analyzed for BTEX, PAH, and Total Lead when this table is used.

NOTE: The UST Branch may consider the variability in analytical results within the laboratory methods specified in USEPA SW-846.

GROUNDWATER

1.0 General

In situations where groundwater has been encountered and an assessment is necessary, the allowable levels in groundwater shall be established through an assessment of site-specific conditions as determined by a registered professional engineer or registered professional geologist.

2.0 Establishing Groundwater Cleanup Standards

Two tables, Groundwater Table I and Groundwater Table II, specify the allowable residual levels in groundwater for closure. A site-specific determination, based on the subsequent criteria, shall be made to establish the appropriate table to be used.

NOTE: All UST facilities shall meet the requirements of 401 KAR 5:031, the surface water standards, for environmentally sensitive features.

GROUNDWATER TABLE I

3.0 Groundwater Table I Criteria

Groundwater Table I shall be used if the following conditions exist:

- The site is serviced by a public water supply, and groundwater is encountered at a depth of 3.0 meters (9.84 feet) or less from the ground surface; or
- Domestic use wells, springs, cisterns, or well head protection areas are located within a 300-meter (984 feet) radius from the excavation zone.

GROUNDWATER TABLE II

4.0 Groundwater Table II Criteria

Groundwater Table II shall be used if the following conditions in sections 4.1 or 4.2 exist:

4.1 The site is serviced by a public water supply and;

- No domestic use wells, springs, cisterns, or well head protection areas are located within a 300-meter (984 feet) radius from the excavation zone; and
- Groundwater has not been encountered at a depth of 3.0 meters (9.84 feet) or less from the ground surface.

4.2 The site is not serviced by a public water supply and;

- No domestic use wells, springs, cisterns, or well head protection areas are located within a 300-meter (984 feet) radius from the excavation zone; and
- The affected groundwater is not a current or potential source for domestic use. (See Section 4.3 below.)

4.3 Groundwater shall not be considered a current or potential source for domestic use if any of the following conditions are verified:

- The affected groundwater zone yields less than 150 gallons per day as determined by a registered professional engineer or geologist using acceptable hydrological methodologies;

- Analysis of any affected groundwater indicates total dissolved solids (TDS) in excess of 10,000 PPM as per 40 CFR 136 method 160.2; or
- An estimation based on relevant information/data (e.g. local pump tests and analysis of similar or same formations, published information, etc.) indicates that the yields of any affected groundwater can be reasonably expected to be less than 150 gallons per day, or that total dissolved solids (TDS) of any affected groundwater can be reasonably expected to exceed 10,000 PPM.

5.0 Public Notice Requirements With The Use Of Groundwater Table II

If a Classification Guide is submitted that indicates that the levels specified in Groundwater Table II are applicable according to the above criteria, and site-specific analysis of groundwater indicates that levels exceeding those specified in Groundwater Table I are present, a Public Notice indicating the intention to leave these levels of petroleum remaining in the groundwater, without plans to remediate, is required. This Public Notice shall be published one time in a newspaper having general circulation in the county where the site is located. Submit the original and one (1) copy of both the invoice and affidavit of publication to the cabinet within seven (7) days after publication. (See Figure A.)

6.0 Application of Groundwater Tables I and II

6.1 In every case, Groundwater Table I levels shall be applied to groundwater at or beyond the Point of Compliance.

6.2 If Groundwater Table II levels are determined to be appropriate at the site, and if groundwater levels above those specified in Groundwater Table I are present in encountered groundwater, a groundwater sample shall be collected at, or as close as possible to, the hydrogeologically downgradient Point of Compliance and analyzed to confirm that groundwater levels exceeding those specified in Groundwater Table I are not present.

FIGURE A

PUBLIC NOTICE

(Example)

Proposal for No Further Action for a UST Facility

For_____

Site Name and Agency Interest #

The Kentucky Energy and Environment Cabinet's Division of Waste Management is proposing to approve no further action for _____(site name) located at _____(street address, city/county).

_____(contractor name) has submitted documentation on behalf of_____(site owner/operator's name) requesting no further action for the UST facility. A Classification Guide has been completed and indicates petroleum hydrocarbon levels in the soil and groundwater are below allowable levels for _____(class, soil table or soil matrix table) and _____(groundwater table) for the site according to the Classification Outline in 401 KAR 42:080. The cabinet proposes to accept the hydrocarbon levels that remain in the groundwater. This tentative decision is based on a thorough review of site conditions and regulatory requirements.

Copies of reports and related documents are available at the UST Branch. To review the documents, contact the UST Branch Records Custodian at 502-564-5981. Hearing- and speech-impaired persons can contact the agency by using the Kentucky Relay Service, a toll-free telecommunication device for the deaf (TDD). For voice to TDD, call 800-648-6057. For TDD to voice, call 800-648-6056. Upon request, the documents can be provided in alternative formats to individuals with disabilities.

Anyone wishing to comment on the cabinet's tentative decision, must do so by _____(date - 30 days from date of publication), the close of the 30-day public comment period. Comments should be submitted to the Division of Waste Management, Underground Storage Tank Branch, 200 Fair Oaks Lane, 2nd Floor, Frankfort, KY 40601.

GROUNDWATER TABLE I
ALLOWABLE GROUNDWATER LEVELS

BTEX	
BENZENE	0.005 PPM
TOLUENE	1.0 PPM
ETHYLBENZENE	0.7 PPM
XYLENE	10.0 PPM
PAH	
cPAH:	0.005 PPM
nPAH:	3.0 PPM
NAPHTHALENE:	0.3 PPM
Total Lead	
0.015 PPM	

GROUNDWATER TABLE II
ALLOWABLE GROUNDWATER LEVELS

BTEX	
BENZENE	0.4 PPM
TOLUENE	9.4 PPM
ETHYLBENZENE	2.4 PPM
XYLENE	10.0 PPM
PAH	
cPAH:	0.005 PPM
nPAH:	3.0 PPM
NAPHTHALENE:	0.3 PPM
Total Lead	
0.015 PPM	

BTEX:	Benzene, Toluene, Ethylbenzene, and Xylene (total)
PAH:	Polynuclear Aromatic Hydrocarbons
cPAH:	Allowable Level Individually for Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Chrysene, Dibenzo(a,h)anthracene, Ideno(1,2,3-cd)pyrene
nPAH:	Allowable Level Individually for Acenaphthene, Acenaphthylene, Anthracene, Benzo(ghi)perylene, Fluoranthene, Fluorene, Phenanthrene, and Pyrene.
PPM:	mg/L - parts per million

Completion of the Classification Guide will determine the allowable levels in soil, if applicable.

NOTE: The UST Branch may consider the variability in analytical results within the laboratory methods specified in USEPA SW-846.